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Kasama

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(54) **FIXING DEVICE AND IMAGE FORMING APPARATUS INCLUDING THE SAME**

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G03G 15/20 (2006.01)

(52) **U.S. Cl.**
CPC *G03G 15/2053* (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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(57) **ABSTRACT**

In a fixing device including a cap member mounted at an end portion of a fixing belt in a rotation shaft direction via a rotation transfer member, an axis center of a support shaft supporting the cap member is made eccentric with respect to a rotation axis center of the fixing belt.

7 Claims, 6 Drawing Sheets

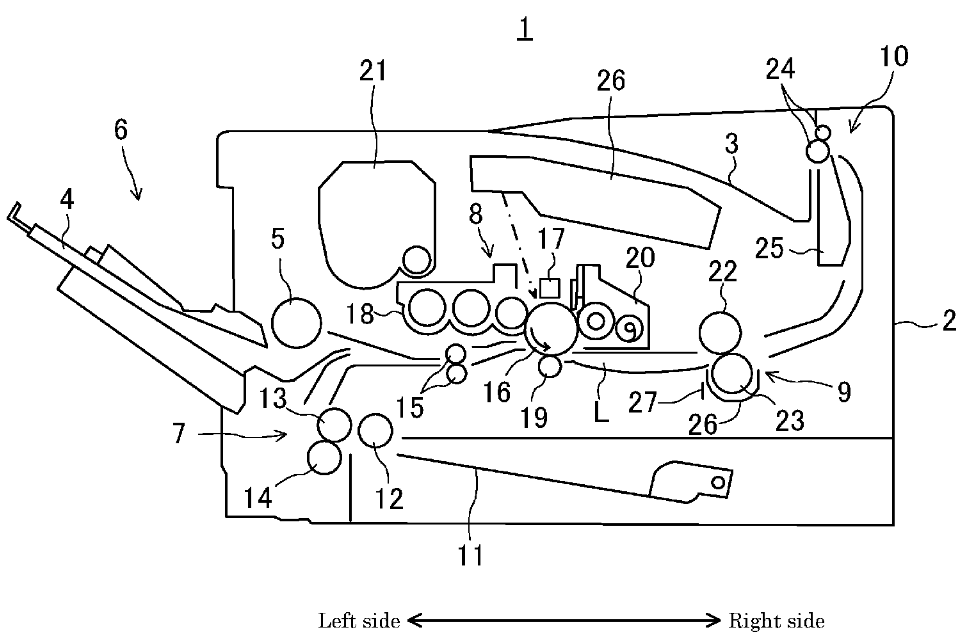
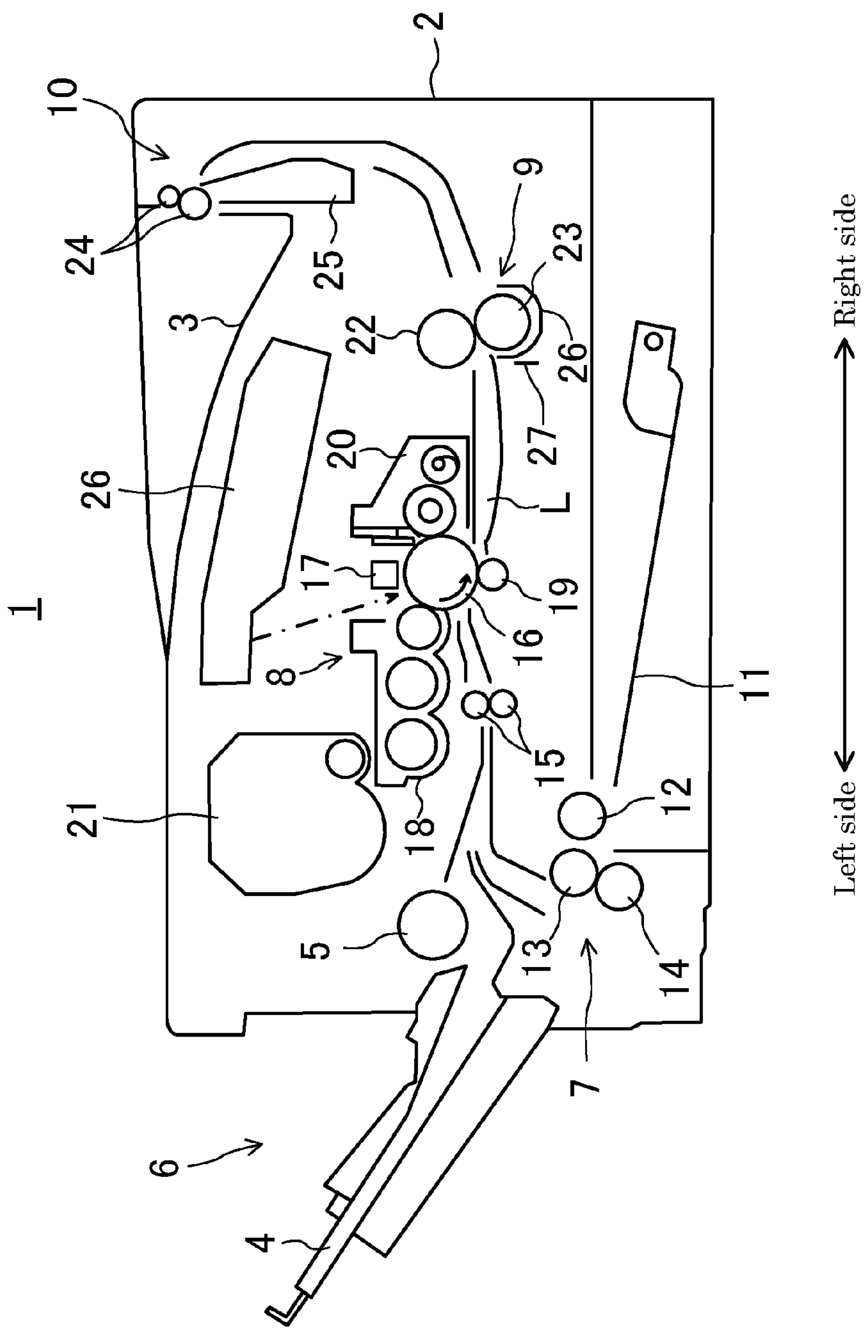


Fig.1



1
2
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4
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6
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8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
L
Left side
Right side

Fig.2

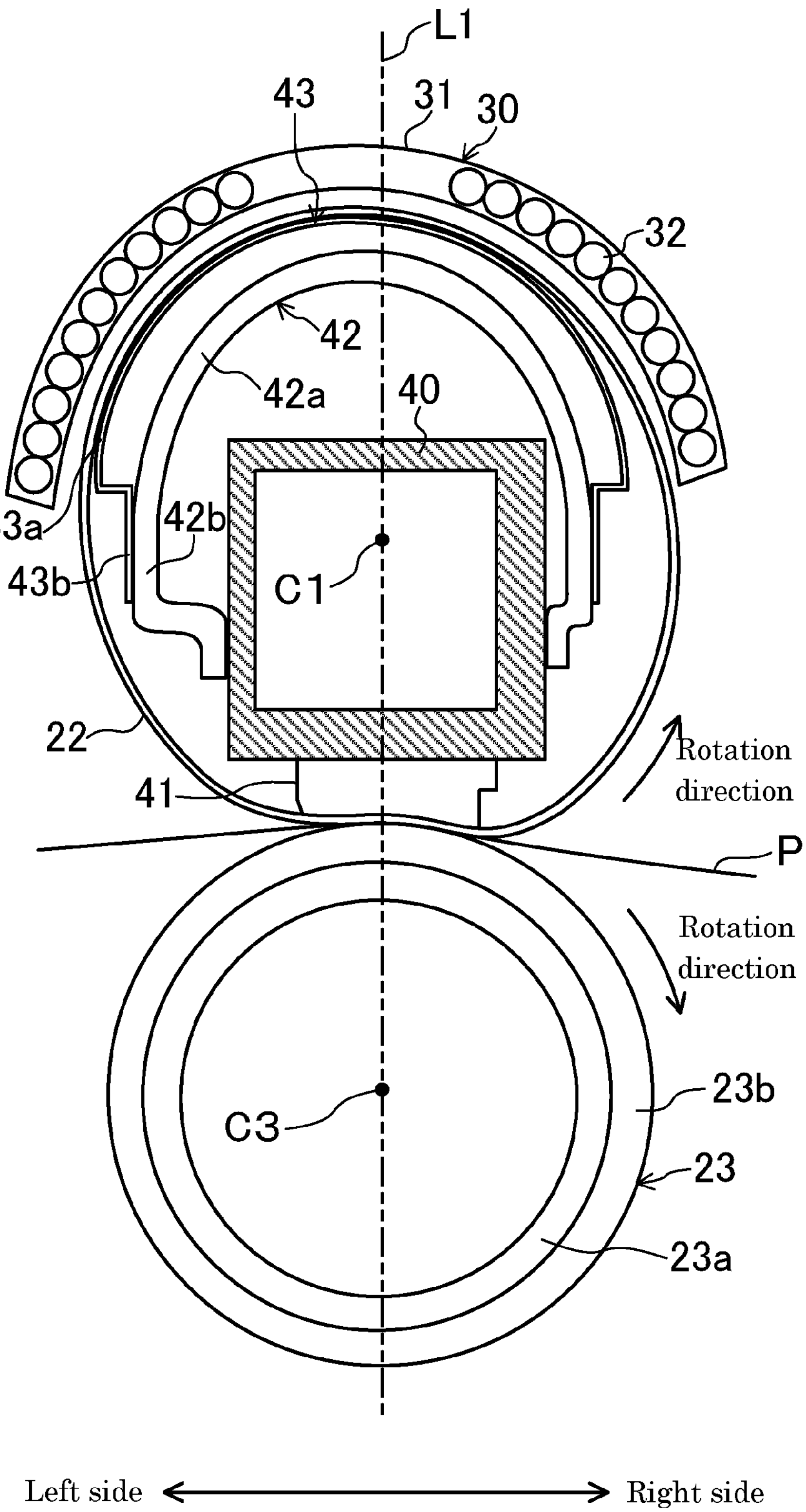

L1
43
31
30
32
42
42a
40
43a
42b
C1
43b
22
41
Rotation direction
P
Rotation direction
23b
C3
23
23a
Left side
Right side

Fig.3

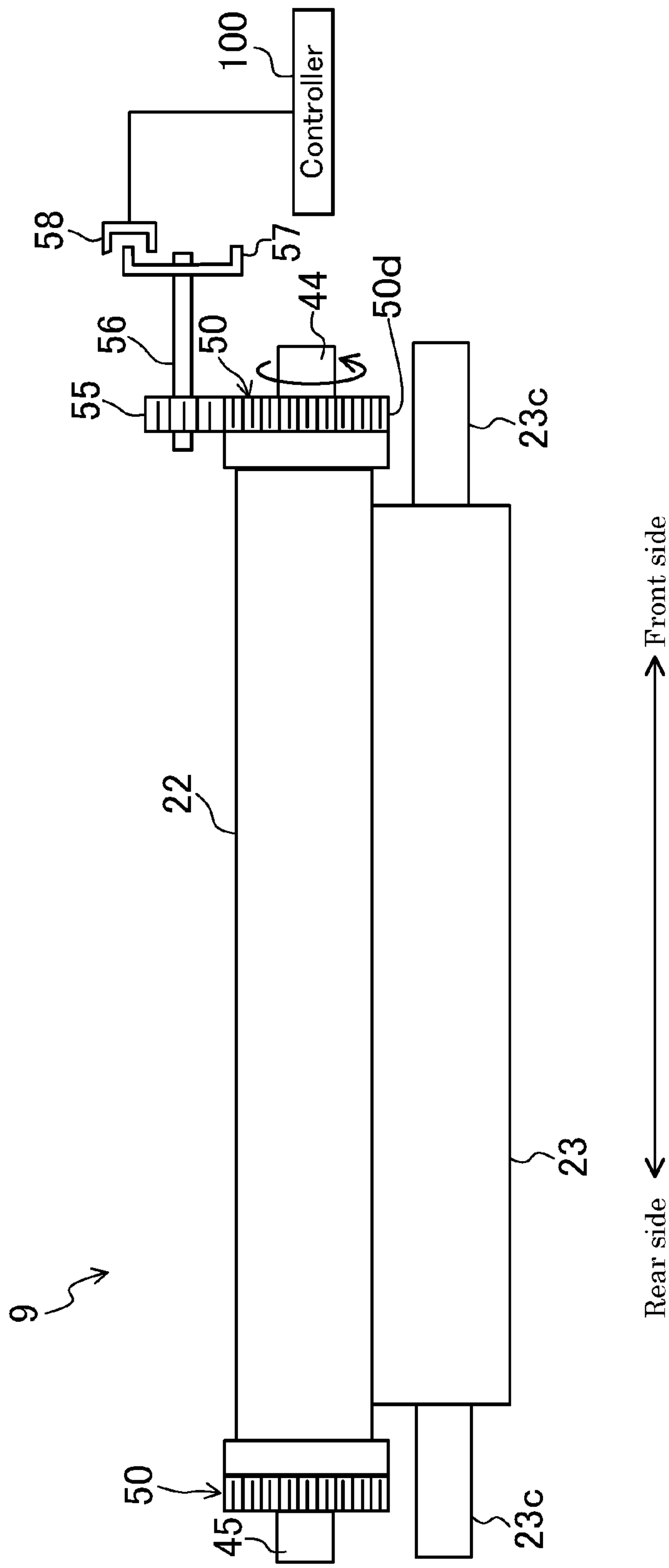

100
Controller
58
57
50d
44
56
50
55
23c
22
Front side
Rear side
23
9
50
45
23c

Fig.4

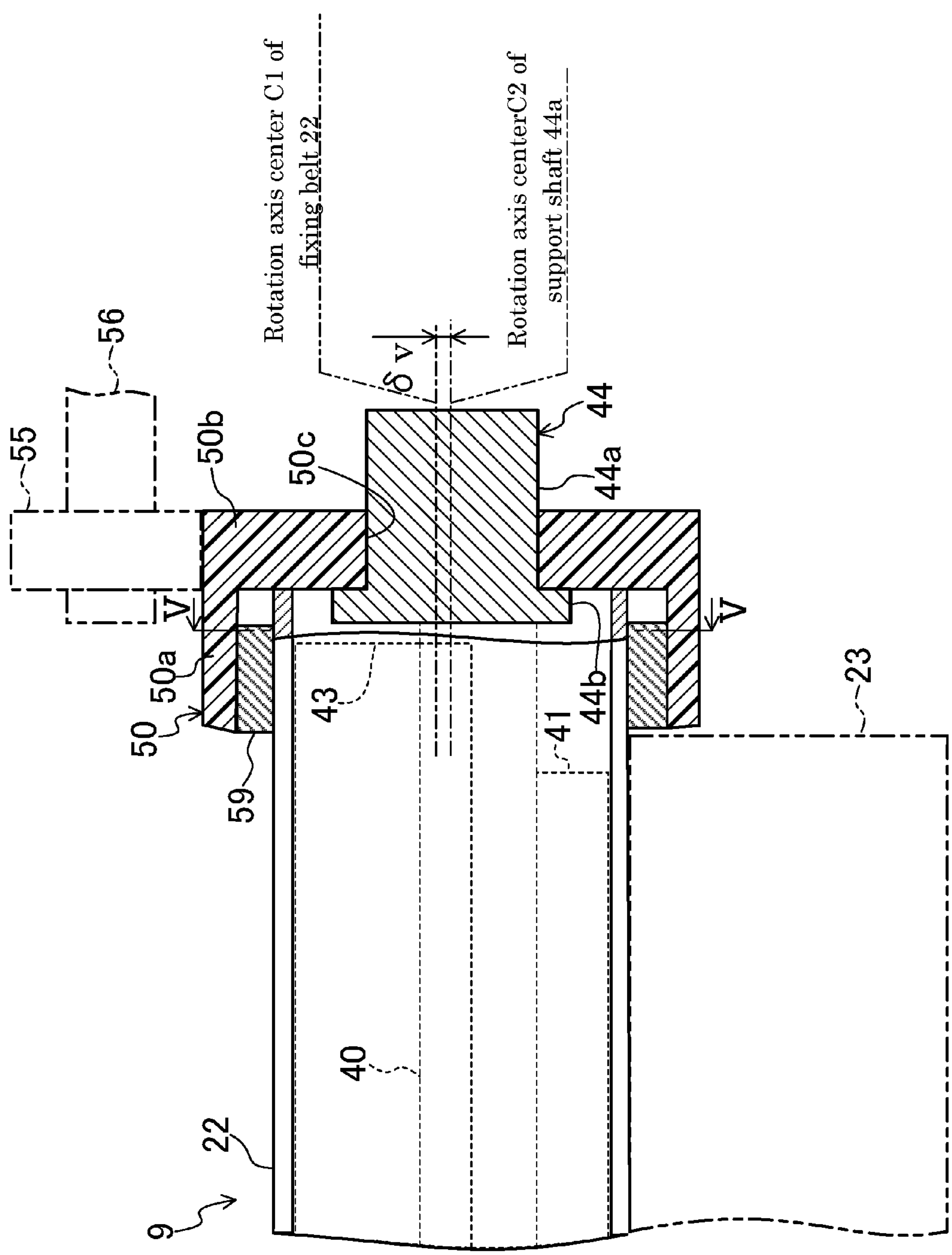

Rotation axis center C1 of fixing belt 22
Rotation axis centerC2 of support shaft 44a
δv
56
55
50b
50c
44
44a
V
V
50a
50
59
43
44b
41
23
40
22
9

Fig.5

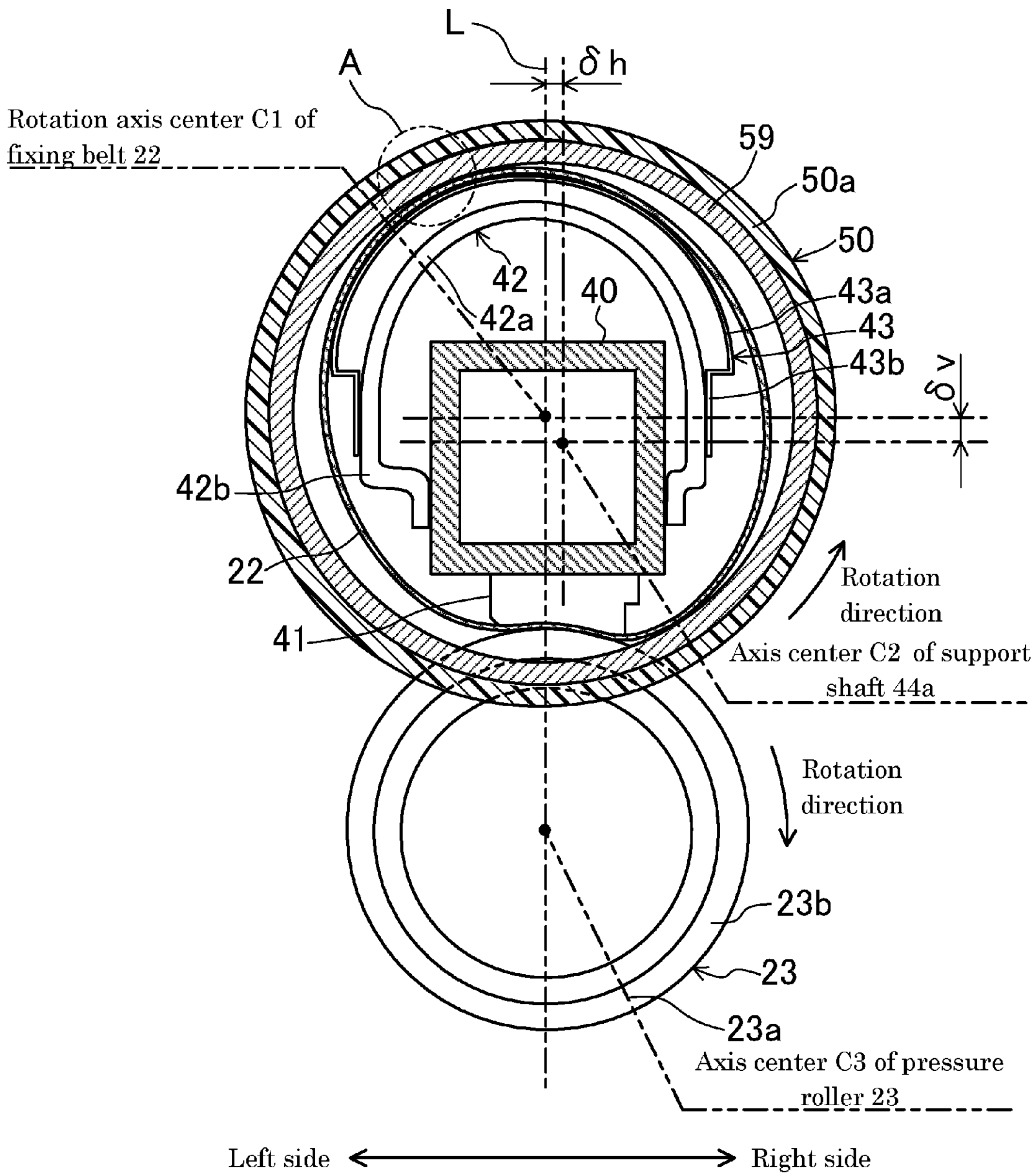
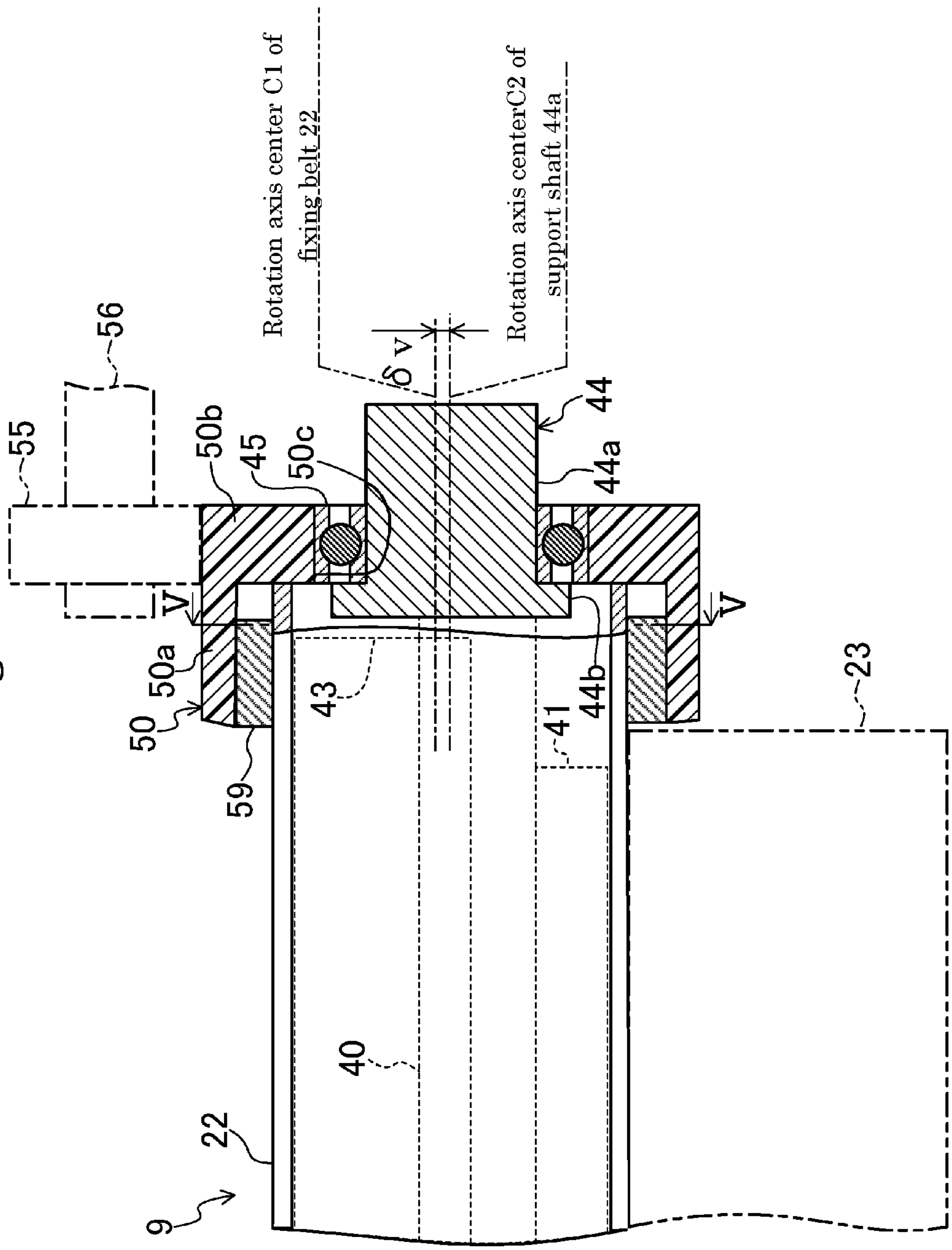

L
A
δh
Rotation axis center C1 of fixing belt 22
59
50a
50
42
40
42a
43a
43
43b
δv
42b
22
41
Rotation direction
Axis center C2 of support shaft 44a
Rotation direction
23b
23
23a
Axis center C3 of pressure roller 23
Left side
Right side

Fig.6


Rotation axis center C1 of
fixing belt 22
Rotation axis centerC2 of
support shaft 44a
δ v
56
55
50b
45
50c
44
44a
V
V
50a
43
44b
41
23
50
59
40
22
9

FIXING DEVICE AND IMAGE FORMING APPARATUS INCLUDING THE SAME

CROSS-REFERENCE TO RELATED APPLICATION

This application is based upon and claims the benefit of priority from Japanese Patent Application No. 2015-016868 filed on Jan. 30, 2015, the entire contents of which are incorporated herein by reference.

BACKGROUND

The technology of the present disclosure relates to a fixing device and an image forming apparatus including the same.

Conventionally, there has been known a fixing device including an endless fixing belt heated by a heating unit, a pressing pad abutting an inner peripheral surface of the fixing belt, and a pressure roller brought into press-contact with the pressing pad at a predetermined pressure while interposing the fixing belt between the pressing pad and the pressure roller. The pressure roller forms a fixing nip portion between the fixing belt and the pressure roller and applies rotational driving force to the fixing belt.

In this type of fixing device, when the fixing belt slips with respect to the pressure roller, there is a problem that the fixing belt is locally heated by the heating unit and thus is broken. In order to avoid such a problem, there has been proposed a fixing device in which a cap member is mounted at an end portion of the fixing belt in a rotation shaft direction and rotation of the cap member is detected by a rotation detection unit, so that rotation of the fixing belt is indirectly detected. In this fixing device, only when the rotation of the cap member (that is, the fixing belt) has been detected by the rotation detection unit, the heating unit is operated. The cap member has a cylindrical part that covers an outer peripheral surface of an end portion of the fixing belt and a disc part that covers one end side of the cylindrical part.

A rotation transfer member including an elastic member has been bonded to an inner peripheral surface of the cylindrical part. The rotation transfer member make contact with the outer peripheral surface of the fixing belt and transfers the rotation of the fixing belt to the cylindrical part of the cap member. The rotation transfer member is compressively deformed at a contact portion with the fixing belt, thereby ensuring a contact pressure.

SUMMARY

A fixing device according to one aspect of the present disclosure includes an endless fixing belt, a heating unit, an abutting member, a pressure roller, a cap member, a support shaft, a rotation transfer member, and a rotation detection unit. The heating unit heats the aforementioned fixing belt. The abutting member is arranged inside the aforementioned fixing belt and abuts an inner peripheral surface of the fixing belt. The pressure roller is brought into press-contact with the aforementioned abutting member at a predetermined pressure while interposing the aforementioned fixing belt between the abutting member and the pressure roller, thereby forming a fixing nip portion between the aforementioned fixing belt and the pressure roller and applying rotational driving force to the aforementioned fixing belt. The cap member has a cylindrical part arranged to cover an outer peripheral surface of an end portion of the aforementioned fixing belt in a rotation shaft direction and a disc part that covers one end side of the cylindrical part. The support shaft passes through the disc part of the aforementioned cap member and supports the cap member so as to be rotatable. The rotation transfer member includes an elastic member. The rotation transfer member is fixed to an inner peripheral surface of the cylindrical part of the aforementioned cap member. Furthermore, the rotation transfer member makes contact with at least a part of an outer peripheral surface of the aforementioned fixing belt, thereby transferring the rotation of the fixing belt to the aforementioned cap member. The rotation detection unit detects the rotation of the aforementioned cap member.

Furthermore, an axis center of the aforementioned support shaft is eccentric with respect to a rotation axis center of the aforementioned fixing belt.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram illustrating an internal structure of an image forming apparatus including a fixing device in an embodiment.

FIG. **2** is a sectional view illustrating a fixing device, which has been cut along a section vertical to a rotation shaft direction of a fixing belt.

FIG. **3** is a side view illustrating a fixing device, which is viewed from a direction perpendicular to a rotation shaft direction of a fixing belt.

FIG. **4** is a partial sectional view of a front end portion of a fixing device.

FIG. **5** is a sectional view taken along line V-V of FIG. **4**.

FIG. **6** is a partial view of a front end portion of a fixing device including a bearing.

DETAILED DESCRIPTION

Hereinafter, an example of an embodiment will be described in detail on the basis of the drawings. It is noted that the technology of the present disclosure is not limited to the following embodiments.

<<Embodiment>>

FIG. **1** is a schematic diagram illustrating a laser printer, which is an example of an image forming apparatus **1** in the present embodiment. In the following description, a "front" and a "rear" indicate a front side and a rear side of the image forming apparatus **1**, and a "left" and a "right" indicate a left side and a right side when the image forming apparatus **1** is viewed from the front side.

As illustrated in FIG. **1**, the image forming apparatus **1** includes a box-like printer body **2**, a manual paper feeding unit **6**, a cassette paper feeding unit **7**, an image forming unit **8**, a fixing device **9**, and a paper discharge unit **10**. In this way, the image forming apparatus **1** is configured to form an image on a paper on the basis of image data transmitted from a terminal and the like (not illustrated) while conveying the paper along a conveyance path T in the printer body **2**.

The manual paper feeding unit **6** has a manual tray **4** provided at one side portion of the printer body **2** so as to be openable and closable, and a manual paper feeding roller **5** provided in the printer body **2** so as to be rotatable.

The cassette paper feeding unit **7** is provided at a bottom portion of the printer body **2**. The cassette paper feeding unit **7** includes a paper feeding cassette **11** that stores a plurality of papers overlapped one another, a pick roller **12** that takes out the papers in the paper feeding cassette **11** one by one, and a feed roller **13** and a retard roller **14** that separate the taken-out papers one by one and send the separated paper to the conveyance path T.

The image forming unit **8** is provided above the cassette paper feeding unit **7** in the printer body **2**. The image forming unit **8** includes a photosensitive drum **16** serving as an image carrying member provided in the printer body **2** so as to be rotatable, a charging device **17** arranged around the photosensitive drum **16**, a developing unit **18**, a transfer roller **19**, a cleaning section **20**, a laser scanner unit (LSU) **26** arranged above the photosensitive drum **16** and serving as an optical scanning device, and a toner hopper **21**. In this way, the image forming unit **8** is configured to form an image on the paper supplied from the manual paper feeding unit **6** or the cassette paper feeding unit **7**.

At the conveyance path T, a pair of resist rollers **15** are provided to temporarily keep the taken-out paper waiting and then supply the paper to the image forming unit **8** at a predetermined timing.

The fixing device **9** is arranged at a lateral side of the image forming unit **8**. The fixing device **9** includes a fixing belt **22** and a pressure roller **23** brought into press-contact with the fixing belt **22** by an urging member (not illustrated). In this way, the fixing device **9** is configured to fix a toner image, which has been transferred to a paper in the image forming unit **8**, to the paper.

The paper discharge unit **10** is provided above the fixing device **9**. The paper discharge unit **10** includes a paper discharge tray **3**, a paper discharge roller pair **24** for conveying papers to the paper discharge tray **3**, and a plurality of conveying guide ribs **25** that guide papers to the paper discharge roller pair **24**. The paper discharge tray **3** is formed in a concave shape at an upper portion of the printer body **2**.

When the image forming apparatus **1** receives image data, the photosensitive drum **16** is rotationally driven and the charging device **17** charges the surface of the photosensitive drum **16** in the image forming unit **8**.

Furthermore, on the basis of the image data, laser light is emitted to the photosensitive drum **16** from the laser scanner unit **26**. The laser light is irradiated, so that an electrostatic latent image is formed on the surface of the photosensitive drum **16**. The electrostatic latent image formed on the photosensitive drum **16** is developed by toner charged in the developing unit **18** and becomes a visible image as a toner image.

Thereafter, the paper passes through between the transfer roller **19** and the photosensitive drum **16**, and a bias having a charged polarity opposite to that of toner is applied to the paper when the paper passes through. As a consequence, the toner image of the photosensitive drum **16** is transferred to the paper. The paper with the transferred toner image is heated and pressed by the fixing belt **22** and the pressure roller **23** in the fixing device **9**. As a consequence, the toner image is fixed to the paper.

As illustrated in FIG. **2**, the fixing device **9** includes the aforementioned fixing belt **22**, the aforementioned pressure roller **23**, an induction heating unit **30**, a stay **40**, a pressing pad **41**, a magnetic shielding member **42**, and a guide member **43**.

The fixing belt **22** is an endless heat resistant belt and is configured by sequentially stacking, from an inner peripheral side, an induction heating layer made of an electroformed nickel, an elastic layer made of a silicon rubber and the like, and a release layer made of a fluororesin and the like, and improving release properties when an unfixed toner image is melt and fixed at a nip portion N. In FIG. **2**, these layers are not distinguished from one another and have been drawn in a simplified manner.

The pressure roller **23** is supported to a housing of the fixing device **9** so as to be rotatable. The pressure roller **23** includes a cored bar **23*a*** made of a stainless steel and the like, an elastic layer **23*b*** provided on an outer peripheral surface of the cored bar **23*a*** and made of a silicon rubber and the like, and a release layer (not illustrated) made of a fluororesin and the like and covering the surface of the elastic layer **23*b***. Furthermore, the pressure roller **23** is rotationally driven by a driving source such as a motor (not illustrated), and the fixing belt **22** is rotated by the rotation of the pressure roller **23**. At a part at which the pressure roller **23** and the fixing belt **22** are brought into press-contact with each other, the nip portion N is formed, and in the nip portion N, an unfixed toner image on a conveyed paper is heated and pressed and thus is fixed to the paper.

The induction heating unit **30** is arranged so as to cover an upper end portion of the fixing belt **22**. The induction heating unit **30** heats the fixing belt **22** by electromagnetic induction. The induction heating unit **30** has a case member **31** and a coil **32** stored in the case member **31**. A heating value (that is, a current) of the coil **32** is controlled by a controller **100** (see FIG. **3**) which will be described later.

The stay **40** is formed of a metallic cylindrical body having a sectional rectangular shape. The stay **40** extends in the fixing belt **22** in a front and rear direction (a rotation shaft direction of the fixing belt **22**).

The pressing pad **41** is fixed to a lower surface of the stay **40**. The pressing pad **41**, for example, is made of liquid crystal polymer and presses the fixing belt **22** to the pressure roller **23** side. The pressure roller **23** is urged to the pressing pad **41** side by an urging member (not illustrated). The pressure roller **23** is pressed to the pressing pad **41** while interposing the fixing belt **22** between the pressing pad **41** and the pressure roller **23**.

The magnetic shielding member **42** has a curved plate part **42*a*** protruding upward and having a sectional arc shape and bending plate parts **42*b*** connected to both right and left ends of the curved plate part **42*a***. The curved plate part **42*a*** is fixed to the side of the stay **40** via the bending plate parts **42*b***. The magnetic shielding member **42** is configured by a non-magnetic material having a good conductivity. The magnetic shielding member **42** prevents a magnetic field generated by the induction heating unit **30** from passing through the stay **40**.

The guide member **43** is provided so as to cover an upper side of the magnetic shielding member **42**. The guide member **43** has a guide body **43*a*** protruding upward and having a sectional arc shape and mounting parts **43*b*** connected to both right and left ends of the guide body **43*a***. Each mounting part **43*b*** is mounted at the bending plate part **42*b*** of the magnetic shielding member **42**.

The guide body **43*a*** is arranged at an opposite side of the pressing pad **41** while interposing a rotation axis center C**1** of the fixing belt **22** between the pressing pad **41** and the guide body **43*a***. The guide body **43*a*** is arranged across a straight line L (see FIG. **5**) passing through an axis center C**3** of the pressure roller **23** and the rotation axis center C**1** of the fixing belt **22** when viewed from the rotation shaft direction of the fixing belt **22**. The guide body **43*a*** is arranged facing the induction heating unit **30** and guides the inner peripheral surface of the fixing belt **22** such that the fixing belt **22** travels along the induction heating unit **30**. An outer peripheral surface of the guide body **43*a*** serves as a guide surface by abutting the inner peripheral surface of the fixing belt **22**.

As illustrated in FIG. **3** and FIG. **4**, the fixing device **9** further includes a pair of cap members **50** mounted at both ends of the fixing belt **22** in the front and rear direction (the rotation shaft direction), a cap support member **44** that supports each cap member **50** so as to be rotatable, a member **57** to be detected, which is rotated according to one cap member **50**, and a rotation detection sensor (a rotation detection unit) **58** that detects the rotation of the member **57** to be detected.

The cap member **50** has a cylindrical part **50***a* that covers an end portion of the fixing belt **22** in the rotation shaft direction from a radial direction outside, and a disc part **50***b* that covers one end side of the cylindrical part **50***a* in an axial direction. The other end side of the cap member **50** in the axial direction is opened. The cap member **50** is fitted onto an end portion of the fixing belt **22** in the axial direction from the opening side. The disc part **50***b* is formed at a center portion thereof with a through hole **50***c*. A support shaft **44***a* of the cap support member **44** passes through the through hole **50***c*.

At an outer peripheral surface of the cylindrical part **50***a* of the cap member **50**, a gear portion **50***d* (see FIG. **3**) is formed to be engaged with a driven gear **55**. The driven gear **55** is connected to the member **57** to be detected via a connection shaft **56**. The member **57** to be detected is formed in a cylindrical cap shape. The rotation detection sensor **58** includes a PI sensor having a light emitting part and a light receiving part. The rotation detection sensor **58** is arranged such that a peripheral wall of the member **57** to be detected is positioned between the light receiving part and the light emitting part. The peripheral wall of the member **57** to be detected is formed with a slit hole for rotation detection. The rotation detection sensor **58** detects whether the member **57** to be detected rotates at a predetermined speed and outputs a detection signal to the controller **100**.

The controller **100** includes a microcomputer having a CPU, a ROM, a RAM and the like. On the basis of the detection signal from the rotation detection sensor **58**, the controller **100** determines whether the cap member **50** rotates at a predetermined speed. When it has been determined that the cap member **50** rotates at the predetermined speed (that is, when it has been determined that the fixing belt **22** does not slip and normally rotates), the controller **100** operates the induction heating unit **30**, and when it has been determined that the cylindrical part **50***a* does not rotate at the predetermined speed (that is, when it has been determined that the fixing belt **22** slips), the controller **100** stops the operation of the induction heating unit **30**.

The cap support member **44** has been fixed to both end portions of the stay **40** in the front and rear direction. The aforementioned stay **40** has been fixed to the housing of the fixing device **9** via the cap support member **44**. The cap support member **44** has the support shaft **44***a* having a columnar shape and a flange part **44***b* protruding in a flange shape to a radial direction outside from the end portion of the support shaft **44***a* at the stay **40** side. The support shaft **44***a* is fitted into the through hole **50***c* formed in the cap member **50** and supports the cap member **50** so as to be rotatable. An axis center C**2** of the support shaft **44***a* and an axis center of the through hole **50***c* coincide with each other.

As illustrated in FIG. **4** and FIG. **5**, a rotation transfer member **59** is mounted at the inner peripheral surface of the cylindrical part **50***a* of the cap member **50** to transfer the rotation of the fixing belt **22** to the cap member **50**. The rotation transfer member **59** is formed in a cylindrical shape and is configured by an elastic member such as a rubber. An outer peripheral surface of the rotation transfer member **59** has been bonded to the inner peripheral surface of the cylindrical part **50***a* by a bonding material.

In the state in which the aforementioned cap member **50** has been mounted at the fixing belt **22**, at least a part of an inner peripheral surface of the rotation transfer member **59** in a circumferential direction makes contact with the outer peripheral surface of the fixing belt **22**. The rotation transfer member **59** is compressively deformed at the contact portion. During the rotation of the fixing belt **22**, frictional force (that is, grip force) is generated by contract pressure between the rotation transfer member **59** and the fixing belt **22**. In this way, the rotation transfer member **59** rotates together with the fixing belt **22** and the rotation of the fixing belt **22** is transferred to the cap member **50** via the rotation transfer member **59**.

As illustrated in FIG. **5**, an axis center of the cap member **50**, that is, the axis center C**2** of the support shaft **44***a* (illustrated only in FIG. **4**) of the cap support member **44** is eccentric with respect to the rotation axis center C**1** of the fixing belt **22**. The position of the rotation axis center C**1** of the fixing belt **22**, for example, can be obtained by three-dimensional measurement. In the three-dimensional measurement, firstly, the cap support member **44** is detached while the position of the stay **40** is being held. In this state, the pressure roller **23** is driven to rotate the fixing belt **22**, and the rotation center of the fixing belt **22** being rotated is measured by a three-dimensional measuring instrument.

The axis center C**2** of the support shaft **44***a* is eccentric downward (to an opposite side of a side, at which the guide member **43** is positioned with respect to the rotation axis center C**1** of the fixing belt **22**) from the rotation axis center C**1** of the fixing belt **22** by a distance δv. The axis center C**2** of the support shaft **44***a* is further eccentric rightward from the aforementioned straight line L by a distance δh.

In the fixing device **9** configured as above, when the fixing belt **22** rotates by receiving driving force from the pressure roller **23**, the rotation of the fixing belt **22** is transferred to the cylindrical part **50***a* of the cap member **50** via the rotation transfer member **59**. In this way, the cap member **50** rotates in synchronization with the fixing belt **22**. The rotation of the cap member **50** is transferred to the member **57** to be detected via the driven gear **55** and the connection shaft **56**, and the rotation of the member **57** to be detected is detected by the rotation detection sensor **58**. Consequently, it is possible to indirectly detect the rotation of the fixing belt **22** by the rotation detection sensor **58**.

In the aforementioned embodiment, the axis center C**2** of the support shaft **44***a* (illustrated only in FIG. **4**) supporting the cap member **50** is eccentric with respect to the rotation axis center C**1** of the fixing belt **22**. Consequently, at a part (a part surrounded by a two dot chain line of FIG. **5**) of the rotation transfer member **59**, which is positioned at an opposite side of the eccentric side of the support shaft **44***a*, it is possible to enhance contact pressure between the rotation transfer member **59** and the fixing belt **22** as much as possible. Thus, it is possible to sufficiently enhance frictional force generated at a contact part between and the rotation transfer member **59**. Thus, it is possible to reliably transfer the rotation of the fixing belt **22** to the cap member **50** by the rotation transfer member **59** without being affected by an error of a shape dimension of the rotation transfer member **59** and the reduction of elastic force due to a secular change. Accordingly, it is possible to accurately perform the rotation detection of the fixing belt **22** using the cap member **50**.

Herein, the aforementioned fixing belt **22** rotates on the outer peripheral surface of the guide body **43***a* toward a left end from a right end of the guide body **43***a* (from one end to the other end of a circumferential direction) (see FIG. **5**). Consequently, the fixing belt **22** is made to easily fit with the outer peripheral surface of the guide body **43***a* at the left end side of the guide body **43**a and is easily loosened at the right end side thereof. In the aforementioned embodiment, focusing on this point, the axis center C**2** of the support shaft **44**a supporting the cap member **50** is made eccentric rightward from the aforementioned straight line L, that is, to the loosened side of the fixing belt **22**, by δh. According to this, the rotation transfer member **59** fixed to the inner peripheral surface of the cap member **50** can be actively pressed to the fitting side and not to the loosened side of the fixing belt **22**. Consequently, it is possible to further enhance the contact pressure between the rotation transfer member **59** and the fixing belt **22**. Consequently, it is possible to further improve rotation transfer efficiency by the rotation transfer member **59**.

As with the aforementioned embodiment, when the axis center C**2** of the support shaft **44**a of the cap support member **44** is made eccentric with respect to the rotation axis center C**1** of the fixing belt **22**, frictional resistance between the outer peripheral surface of the support shaft **44**a and the through hole **50**c (see FIG. **4**) of the cap member **50** may increase. In order to prevent such a problem, it is preferable that the surface roughness of the inner peripheral surface of the through hole **50**c, or the surface roughness of an outer peripheral surface of a part of the support shaft **44**a passing through the through hole **50**c, for example, is made equal to or more than Ra (arithmetic average roughness) of 50 μm.

In this way, a contact area between the outer peripheral surface of the support shaft **44**$a$and the inner peripheral surface of the through hole **50**c of the cap member **50** is made small as much as possible, so that it is possible to reduce frictional resistance generated between the two. Accordingly, it is possible to prevent the cap member **50** from slipping with respect to the fixing belt **22**. According to other configurations, a bearing **45**, as illustrated in FIG. **6**, may also be interposed between the outer peripheral surface of the support shaft **44**a and the inner peripheral surface of the through hole **50**c of the cap member **50**. In this way, it is possible to further reduce the frictional resistance between the support shaft **44**a and the cap member **50**.

<<Other Embodiments>>

In the aforementioned embodiment, the image forming apparatus **1** is configured by a laser printer; however, the present invention is not limited thereto and the image forming apparatus **1**, for example, may also include a copy machine, a multifunctional peripheral and the like.

In the aforementioned embodiment, the fixing belt **22** is heated by the induction heating unit **30**; however, the present invention is not limited thereto and the fixing belt **22** may also be heated by a halogen heater and the like.

What is claimed is:

1. A fixing device comprising:

an endless fixing belt;

a heating unit that heats the fixing belt;

an abutting member arranged inside the fixing belt and abutting an inner peripheral surface of the fixing belt;

a pressure roller brought into press-contact with the abutting member at a predetermined pressure while interposing the fixing belt between the abutting member and the pressure roller, thereby forming a fixing nip portion between the fixing belt and the pressure roller and applying rotational driving force to the fixing belt;

a cap member having a cylindrical part arranged to cover an outer peripheral surface of an end portion of the fixing belt in an axial direction of the fixing belt and a disc part that covers one end side of the cylindrical part;

a support shaft that is coaxially arranged with the cap member and engaged with a through hole formed in a center part of the disc part of the cap member and supports the cap member so as to be rotatable;

a rotation transfer member including a cylindrical elastic member only provided between a cylindrical inner peripheral surface of the cap member and the outer peripheral surface of the fixing belt, and fixed to the inner peripheral surface of the cylindrical part to make contact with at least a part of the outer peripheral surface of the fixing belt, thereby transferring rotation of the fixing belt to the inner peripheral surface of the cap member by friction force from the part in contact;

a rotation detection unit for detecting rotation of the cap member; and

a guide member forming an arc shape across a straight line passing through a rotation axis center of the fixing belt and an axis center of the pressure roller when viewed from the axial direction of the fixing belt, and having an outer peripheral surface abutting the inner peripheral surface of the fixing belt to guide the rotation of the fixing belt,

wherein the fixing belt rotates on the outer peripheral surface of the guide member from one end to another end of the outer peripheral surface in a circumferential direction by a rotational driving force applied by the pressure roller, and

wherein an axis center of the support shaft is eccentric to one end side of the straight line with respect to the rotation axis center of the fixing belt.

2. The fixing device of claim **1**, wherein

the through hole allows the support shaft to pass therethrough and is engaged with the support shaft, and

a surface roughness Ra of an inner peripheral surface of the through hole or an outer peripheral surface of a part of the support shaft passing through the through hole is equal to or more than 50 μm.

3. The fixing device of claim **2**,

wherein the axis center of the support shaft is eccentric to a pressure roller side with respect to the rotation axis center of the fixing belt.

4. The fixing device of claim **1**, further comprising

a bearing provided between an inner peripheral surface of the through hole and an outer peripheral surface of the support shaft, wherein

the support shaft is engaged with the through hole via the bearing.

5. The fixing device of claim **4**,

wherein the axis center of the support shaft is eccentric to a pressure roller side with respect to the rotation axis center of the fixing belt.

6. An image forming apparatus comprising the fixing device of claim **1**.

7. The fixing device of claim **1**,

wherein the axis center of the support shaft is eccentric to a pressure roller side with respect to the rotation axis center of the fixing belt.

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